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*The War with Germany: a Statistical Summary.* By Leonard P. Ayres, Colonel, General Staff. Washington: Government Printing Office, 1919. Pp. 154.

From early times the conditions of warfare have led to a recognition of the importance of quantitative values. The battle of Thermopylae is remembered chiefly because of a notable disparity in the numerical strength of the forces engaged. Collecting and preserving statistical facts is a routine function of military organizations, and the records of modern wars contain more or less information concerning the men and officers who served, casualties, prisoners taken, artillery and small arms employed, and supplies consumed.

Considered from the statistician's standpoint, the war against Germany differed from earlier conflicts, first, in the volume and diversity of the items of information assembled and, second, in the fact that the recording and collating of much of this material was recognized as a statistical task and was intrusted to skilled and experienced statisticians. The report prepared by Colonel Ayres is the first important publication, at least in the United States, in which statistical methods have been consciously applied to the administrative phases of the war.

The scope of the report is shown by the following condensed list of subjects: Men drafted; period of training; transportation of troops; production and transportation of food, clothing, equipment, motors, aircraft, artillery, rifles, and revolvers; ground gained in battle; health and casualties, and international comparisons. The report is a War Department publication, dealing only with those portions of the war against Germany in which the United States was engaged, and only with those phases of American participation which came under the direction of the Secretary of War. The work of the Navy, while mentioned with appreciation, is not described, and that of the Marine Corps is only incidentally referred to. In his letter of authorization, the Secretary of War asks for a presentation of "significant facts and figures with respect to those major steps in our military preparation and action which, taken together, constitute the record of our participation in the war." Considered with reference to these instructions, the selection of topics seems admirable. No reference is made to routine functions of the War Department affecting personnel, such as the transmission of mail between men in service and their relatives, the reporting of casualties, and the payment of the troops, which have a direct bearing on the morale of the army and the civil population. In view of public interest in these subjects any statistics which could be compiled would have been acceptable.

In plan of treatment, the report is descriptive rather than analytical. It is addressed, primarily, not to students of statistics or of history, but to all intelligent readers who wish to be informed as to the facts of the war. Where comparisons are made their purpose is to lend emphasis to the description of conditions, rather than to connect cause with effect. The

author has sought, above all, to make his presentation of facts clear and striking, and his efforts have been successful to an exceptional degree.

By the omission of details of information and descriptions of technical procedure, the report has been fitted to the requirements of the general audience to which it is primarily addressed. The condensation of statistical subject matter is a difficult task, but the data have been selected with skill. Only a few isolated instances have been noted in which the array of facts and figures appears incomplete, or the discussion insufficient.

The comparisons of the work and achievements of the different countries engaged in the war with Germany seem imperfectly descriptive because of the omission of essential factors. Thus, on page 14, there is a diagram comparing the numerical strength of the British and American armies in France during the period from 1914 to the signing of the armistice, and the statement is made that it took England three years to reach a strength of two million men, while the United States accomplished an equivalent result in one half that time. The fact that from the very outset of the war the English were forced to make good the effects of heavy casualties, and that the increase in their forces was in this way materially retarded, is referred to in the text, but it would have been well, in view of the overwhelming importance of this factor, to have based the comparison upon the numbers of men sent to France each month. Even after such a change in method, the data would have but superficial significance by reason of the difference in the populations and resources of the two nations and the disproportionate demands made upon the British by the requirements of their navy, which contributed so largely to the final victory, the operation of their merchant marine, and the maintenance of armed forces in Mesopotamia, Egypt, Palestine and the Balkans. A like criticism applies to most of the material presented in the final pages of the report under the heading "International Comparisons," for here again armies and armaments are compared without reference to the population and wealth of the different countries. While statistician or student of international affairs can readily sense the lack in these statistics and will be protected by his knowledge from erroneous conclusions, to many readers of the report the incomplete comparisons may be actually misleading. It is true that the author is not attempting analysis, but the passages referred to are not satisfactory as description, for the presentation of all significant facts is the first essential of description.

In the chapter entitled "Health and Casualties," which is the most analytical of the report, the difficulties of condensed presentation are most apparent. This chapter begins with a comparison of fatalities per 1,000 men in different armies and in different wars. As no reference is made to the duration of the periods during which the armies were employed nor to the intensity of the fighting, it is not surprising that, in the war with Germany, the losses of foreign armies greatly exceeded those of the American army, and that the loss sustained by the American army in this war fell short of those of the North in the American Civil War. Total losses, without reference to the duration of the fighting, clearly have a marked

social and economic significance; but in this connection losses should be related to total population rather than to military forces.

On page 124 of this same chapter the losses of the American armies per 1,000 men in different wars are compared on an annual basis. This procedure is clearly correct, but the statement is made, in the discussion of the figures, that the losses in the European war were "higher than in the Civil War because all of the fighting was concentrated in one year, while in the Civil War it stretched over four years." It is evident that the effect of the length of the period during which the armies were employed is allowed for by placing the rates upon an annual basis.

The discussion of the control of disease suggests the advisability of a further analysis of the statistical material. From the diagram on page 124, already referred to, it appears that the death rate from disease among American troops was 26 per 1,000, on an annual basis, in the Spanish War, and but 19 per cent. 1,000 in the war with Germany. It is further reported, however, that of the deaths from disease in the earlier war 85 per cent. were caused by typhoid fever, as compared with only one half of one per cent. in the recent war, and the application of these percentages to the reported death rates from disease shows that the rate per 1,000 from disease other than typhoid was  $18.9 (19 \times [1.000 - .005])$  in the war with Germany, as compared with  $3.9 (26 \times [1.00 - .85])$  for the Spanish War. It is true that, in the war with Germany, pneumonia, resulting in a large measure from the influenza epidemic which presumably could not have been foreseen nor prevented by the army authorities, caused 83.6 per cent. of all the deaths from disease, the death rate from all diseases other than pneumonia and typhoid being 3.02 per 1,000, a figure lower than that for diseases other than typhoid cited above for the war with Spain. However, deaths from pneumonia doubtless occurred in the Spanish War, contributing to the rate of 3.9, and the pneumonia deaths of the war with Germany cannot all have been the result of influenza—indeed, the report states (page 126) that measles were prevalent during the first of the war and "particularly dangerous as the predecessor of pneumonia." It seems to follow that, except for the elimination of typhoid as an important cause of fatalities, the death rate from diseases may not have been appreciably lower in the war with Germany than in the war with Spain. But the reviewer's analysis is too tentative in character to serve as a basis of conclusions; it is presented as a means of directing attention to the need for a further study of the records.

The clearness and effectiveness of presentation which characterize the report have been achieved, in a large measure, through the employment of seventy-two diagrams and twelve maps. The text discussion is built on and about the diagrams, the tabular statements employed being brief and incidental. In a report dealing, as this one does, with a wide range of subjects, and intended for a popular audience, a long series of diagrams identical in plan would be monotonous. The economy of mental effort resulting from similarity of form is less important than the stimulation of the attention to be obtained through variety. In employing a large

number of different graphical types, the author has applied with fidelity the fundamental rule of graphical presentation which prescribes the inclusion of the zero line. The procedure followed throughout the report of placing figures at the ends of bars of varying length and inserting figures in bars and columns may be open to question from the standpoint of optical effect, but it does not seem that the results are in any case misleading. The presentation of figures upon which graphical representations are based constitutes sound and useful practice. With the exception of those on pages 41 and 42, which fall well below the prevailing standard of execution, the statistical maps are admirable.

The report is, a successful venture in the field of statistical journalism; to quantitative subject matter of current interest the author has imparted proportion and vividness. He has done much in addition to this. Without attempting a complete mapping of the statistical territory created by the war, he has established landmarks which will be of great value to workers concerned with the details of special problems. He has produced, also, a convenient and readable handbook which, as a source of authoritative and definite information about some of the central facts of American participation in the war, will be useful for an indefinite period.

EARLE CLARK.

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#### STATISTICS OF THE INFLUENZA EPIDEMIC.

The subject of statistical study of the influenza epidemic was brought up at a special meeting of this Association held March 28, 1919, at the City Club, New York City. A speaker representing the Vital Statistics Section of the American Public Health Association outlined what had been accomplished by a committee of that organization in planning statistical studies of American influenza data. The speaker indicated the bearing upon modern statistical practice of what had been done for the data of the epidemic of thirty years ago, quoting Leichenstern\* as to the contributions which the statistical profession had made to the history of influenza.

"Epidemiologic investigation is much indebted to modern statistics for its progress, to the high development of medical journalism, and to the powers that have been universally brought to bear toward achieving collective investigations and scientific researches."

The German Collective Investigation by Geyder and Guttmann; the exhaustive reports by Parsons (1889-1892); the French Academy report by Proust-Brouardel, and the army report of Kelsch and Antony; the Russian report by Teissier; the Belgian "*enquête sur l'épidémie de grippe*"; the Dutch report of Solomonson and de Rooj; the Danish report by Carlssen; the Swedish by Linroth; the Egyptian by Engel-Bey; as well as the investigation by Abbott (Massachusetts), and for Riga, Cologne and Danzig, were mentioned as types of statistical inquiries providing the pattern for researches into the recent epidemic.

\* "Nothnagel's Encyclopedia of Practical Medicine," Saunders, Phila., 1905.